DIVISION 8
MISCELLANEOUS CONSTRUCTION

8-01 EROSION CONTROL AND WATER POLLUTION CONTROL

8-01.1 Description

This work shall consist of furnishing, installing, maintaining, removing and disposing of water pollution and erosion control items in accordance with these Specifications and as shown in the Plans or as designated by the Engineer.

8-01.2 Materials

Materials shall meet the requirements of the following sections:

Mulch and Amendments 9-14.4
Erosion Control Devices 9-14.5
Construction Geotextile 9-33
Quarry Spalls 9-13

8-01.3 Construction Requirements

8-01.3(1) General

Controlling pollution, erosion, runoff, and related damage requires the Contractor to perform temporary work items including but not limited to:

1. Providing ditches, berms, culverts, and other measures to control surface water;
2. Building dams, settling basins, energy dissipaters, and other measures, to control downstream flows;
3. Controlling underground water found during construction; or
4. Covering or otherwise protecting slopes until permanent erosion-control measures are working.

To the degree possible, the Contractor shall coordinate this temporary work with permanent drainage and erosion control work the contract requires.

The Engineer may require additional temporary control measures if it appears pollution or erosion may result from weather, the nature of the materials, or progress on the work.

When natural elements rut or erode the slope, the Contractor shall restore and repair the damage, with the eroded material where possible, and clean up any remaining material in ditches and culverts. When the Engineer orders replacement with additional or other materials, unit contract prices will cover the quantities needed.

If the Engineer anticipates water pollution or erosion, the Contractor shall schedule the work so that grading and erosion control immediately follows clearing and grubbing. The Engineer may also require erosion control work to be done with or immediately after grading. Clearing, grubbing, excavation, borrow, or fill within the right of way shall never expose more erodible earth than as listed below, without written approval by the Engineer:

Area	Date	Location
17 Acres	April 1 - October 31	East of the Summit of the Cascade Range
	May 1 - September 30	West of the Summit of the Cascade Range
5 Acres	November 1 - March 31	East of the Summit of the Cascade Range
	October 1 - April 30	West of the Summit of the Cascade Range

The Engineer may increase or decrease the limits in light of project conditions.

Erodible earth is defined as any surface where soils, grindings, or other materials are capable of being displaced and transported by rain, wind, or surface water runoff.

In western Washington, erodible soil not being worked, whether at final grade or not, shall be covered within the following time period, using an approved soil covering practice, unless authorized otherwise by the Engineer:

October 1 through April 30	2 days maximum
May 1 to September 30	7 days maximum

If the Engineer, under Section 1-08.6, orders the work suspended for an extended time, the Contractor shall, before the Contracting Agency assumes maintenance responsibility, make every effort to control erosion, pollution, and runoff during shutdown. Section 1-08.7 describes the Contracting Agency's responsibility in such cases.

Nothing in this section shall relieve the Contractor from complying with other contract requirements.

8-01.3(1)A Submittals

When a temporary erosion and sediment control (TESC) plan is included in the plans, the Contractor shall either adopt or modify the existing TESC plan. The Contractor shall provide a schedule for TESC plan implementation and incorporate it into the Contractor's progress schedule. The Contractor shall obtain the Engineer's approval on the TESC plan and schedule before any work begins. The TESC plan shall cover all areas the Contractor's work may affect inside and outside the limits of the project (including all Contracting Agency-provided sources, disposal sites, and haul roads, and all nearby land, streams, and other bodies of water).

The Contractor shall allow at least five working days for the Engineer's review of any original or revised plan. Failure to approve all or part of any such plan shall not make the Contracting Agency liable to the Contractor for any work delays.

8-01.3(1)B Erosion and Sediment Control (ESC) Lead

The Contractor shall identify the ESC lead at the preconstruction discussions. The ESC Lead shall have, for the life of the contract, a current Certificate of Training in Construction Site Erosion and Sediment Control from a course approved by WSDOT's Statewide Erosion Control Coordinator.

The ESC Lead shall implement and update the Temporary Erosion and Sediment Control (TESC) plan. Implementation shall include, but is not limited to:

1. Installing, maintaining, inspecting and repairing all temporary erosion and sediment control Best Management Practices (BMPs) included in the TESC plan to assure continued performance of their intended function. All on-site erosion and sediment control measures shall be inspected at least once every five working days, each working day during a runoff-producing rain event, and within 24 hours after a runoff-producing rain event. Damaged or inadequate TESC measures shall be corrected immediately. A TESC Inspection Report shall be prepared for each inspection and shall be included in the TESC file. A copy of each report shall be provided to the Engineer. The inspection report shall include, but not be limited to:
   a. When, where and how BMPs were installed, maintained, modified, and removed;
   b. Repairs needed and repairs made;
   c. Observations of BMP effectiveness and proper placement;
   d. Recommendations for improving performance of BMPs.

2. Preparing, maintaining, and updating a TESC file on site that includes, but is not limited to:
   a. TESC Inspection Reports.
   b. Stormwater site plan.
   c. Temporary Erosion and Sediment Control (TESC) Plan.
   d. National Pollutant Discharge Elimination System construction permit (Notice of Intent).
   e. Other applicable permits.

Upon request, the file shall be provided to the Engineer for review.

8-01.3(1)C Ground Water

When ground water is encountered in an excavation, it shall be treated and discharged as follows:

1. When the ground water meets State Water Quality standards, it may bypass detention and treatment facilities and be routed directly to its normal discharge point at a rate and method that will not cause erosion.
2. When the turbidity of the ground water is similar to the turbidity of the site runoff, the ground water may be treated using the same detention and treatment facilities being used to treat the site runoff and then discharged at a rate that will not cause erosion.
3. When the turbidity is worse than the turbidity of the site runoff, the ground water shall be treated separately until the turbidity is similar to or better than the site runoff before the two may be combined and treated using the same detention and treatment facilities being used to treat the site runoff and then discharged at a rate that will not cause erosion.

8-01.3(1)D Detention/Retention Pond Construction

When a detention or retention pond is required, whether it is temporary or permanent, it shall retain/detain the full final design volume of stormwater before beginning other grading and excavation work in the area that drains into that pond. Temporary conveyances shall be installed concurrently with grading in accordance with the TESC plan so that newly graded areas drain to the pond as they are exposed.

8-01.3(2) Temporary Seeding, Mulching, and Soil Binding

8-01.3(2)A Temporary Seeding

Temporary seeding is used to establish temporary cover on disturbed soil. Temporary seeding shall be in accordance with Section 8-02.

8-01.3(2)B Temporary Mulching

Temporary mulch, such as straw, wood cellulose (with and without tackifier), compost, or other best management practices as approved by the Engineer, may be applied at any time of the year for soil cover. Temporary mulching shall be in accordance with Section 8-02.3(15).

8-01.3(2)C Soil Binding Using Polyacrylamide (PAM)

The PAM shall be completely dissolved and mixed in water prior to being applied to the soil. PAM shall be applied only on bare soil at a rate of not more than 0.5 pounds per 1M gallons of water per acre. A minimum of 200 pounds per acre of cellulose fiber mulch treated with a non-toxic dye shall be applied with the PAM.

PAM shall be applied only to areas that drain to completed sedimentation control BMPs in accordance with the TESC plan. PAM shall not be applied to the same area more than once in a 48 hour period, or more than 7 times in a 30 day period.

PAM shall not be applied during a rain or to saturated soils.

8-01.3(3) Placing Erosion Control Blanket

When required, erosion control blanket shall be placed immediately following the seeding and fertilizing operation. Temporary erosion control blankets as defined in 9-14.5, having an open area of 60% or greater, may be installed prior to seeding.

8-01.3(4) Placing Compost Blanket

Compost blanked shall be placed to a depth of 3 inches over bare soil. Compost blanket shall be placed before seeding or other planting. Compost used for compost blanket shall meet the requirements of 9-14.4(8).

8-01.3(5) Placing Plastic Covering

Plastic meeting the requirements of Section 9-14.5(3) shall be placed with at least a 12-inch overlap of all seams.

Clear plastic covering shall be used to promote growth of vegetation. Black plastic covering shall be used for stockpiles or other areas where vegetative growth is unwanted.

The cover shall be maintained tightly in place by using sandbags on ropes in a 10-foot, maximum, grid. All seams shall weighted down full length.

8-01.3(6) Check Dams

Check dams shall be installed as soon as construction will allow, or when designated by the Engineer. The Contractor may substitute a different check dam for that specified with approval of the Engineer. Check dams shall be placed in ditches perpendicular to the channel. Check dams shall be of sufficient height to maximize detention, without causing water to leave the ditch.

8-01.3(6)A Geotextile-Encased Check Dam

The geotextile-encased check dam shall meet the requirements in Section 9-14.5(4) Geotextile-Encased Check Dam.

Installation of geotextile-encased check dams shall be in accordance with the Plans, and shall be anchored to hold it firmly in place under all conditions.

8-01.3(6)B Rock Check Dam

The rock used to construct rock check dams shall meet the requirements for quarry spalls, in accordance with Section 9-13.6.

8-01.3(6)C Sandbag Check Dam

Sandbags shall be placed so that the initial row makes tight contact with the ditch line for the length of the dam. Subsequent rows shall be staggered so the center of the bag is placed over the space between bags on the previous lift.

8-01.3(6)D Wattle Check Dam

Wattle used to construct wattle check dams shall meet the requirements for 8-01.3(10).

8-01.3(7) Stabilized Construction Entrance

Temporary stabilized construction entrance shall be constructed in accordance with the Plans, prior to beginning any clearing, grubbing, earthwork or excavation.

When the stabilized entrance no longer prevents track out of sediment or debris, the Contractor shall either rehabilitate the existing entrance to original condition, or construct a new entrance.

When the contract requires a tire wash in conjunction with the stabilized entrance, the Contractor shall include details for the tire wash and the method for containing and treating the sediment-laden runoff as part of the erosion control plan. All vehicles leaving the site shall stop and wash sediment from their tires.

8-01.3(8) Street Cleaning

Self-propelled pickup street sweepers shall be used, whenever required by the Engineer, to prevent the transport of sediment and other debris off the project site. Street washing with water will require approval by the Engineer.

8-01.3(9) Sediment Control Barriers

Sediment control barriers shall be installed in accordance with TESC plan or manufacturer's recommendations in the areas of clearing, grubbing, earthwork or drainage prior to starting those activities.

The sediment control barriers shall be maintained until the soils are stabilized.

8-01.3(9)A Silt Fence

Silt fence shall be constructed in accordance with the Plans.

When backup support is used, steel wire shall have a maximum mesh spacing of 2 inches by 4 inches, and the plastic mesh shall be as resistant to ultraviolet radiation as the geotextile it supports.

The geotextile shall be attached to the posts and support system using staples, wire, or in accordance with the manufacturer's recommendations.

The geotextile shall be sewn together at the point of manufacture, or at a location approved by the Engineer, to form geotextile lengths as required. All sewn seams and overlaps shall be located at a support post.

Posts shall be either wood or steel. Wood posts shall have minimum dimensions of 1 1/4 inches by 1 1/4 inches by the minimum length shown in the Plans. Steel posts shall consist of U, T, L, or C shape posts with a minimum weight of 1.33 lbs/ft, or other steel posts having equivalent strength and bending resistance to the posts listed.

When sediment deposits reach approximately one-third the height of the silt fence, the deposits shall be removed.

8-01.3(9)B Gravel Filter, Wood Chip or Compost Berm

The gravel filter berm shall be a minimum of one foot in height and shall be maintained at this height for the entire time they are in use.

The wood chip berm shall be a minimum of two feet in height and shall be maintained at this height for the entire time they are in use. Wood chips shall meet the requirements in Section 9-14.4(3).

Compost shall be Type 2 in accordance with Section 9-14.4(8).

8-01.3(9)C Straw Bale Barrier

Straw shall conform to Section 9-14.4(1).

8-01.3(9)D Inlet Protection

Inlet protection can be performed below and above the inlet grate, or as a cover. All devices shall be installed prior to clearing, grubbing or earthwork activities and shall be as shown in the Plans.

Geotextile fabric in all prefabricated inlet protection devices shall meet or exceed the requirements of Table 1 for Moderate Survivability, and the minimum filtration properties of Table 2, in Section 9-33.2.

When the depth of accumulated sediment and debris reaches approximately one-half the height of an internal device or one-third the height of the external device (or less when so specified by the manufacturers), the deposits shall be removed and stabilized on site.

8-01.3(9)E Below Inlet Grate

These devices shall be prefabricated units specifically designed for inlet protection and shall remain securely attached to the drainage structure when fully loaded with sediment and debris, or at the maximum level of sediment and debris specified by the manufacturer.

8-01.3(9)F Above Inlet Grate

These devices may be silt fence or prefabricated units specifically designed for inlet protection having the following features:

The device shall remain securely in place around the drainage structure under all conditions.

8-01.3(9)G Inlet Grate Cover

These devices shall be prefabricated units specifically designed for inlet protection and have the following features:

1. Be a sewn geotextile fabric unit fitted to the individual grate and completely enclosing the grate.
2. Have built-in lifting devices to allow manual access of the stormwater system.
3. Utilize an orange monofilament geotextile fabric.

Check dams or functionally equivalent devices may be used as inlet protection devices with the approval of the Engineer.

8-01.3(10) Wattles

Wattles shall be installed as soon as construction will allow or when designated by the Engineer Trench construction and wattle installation shall begin from the base of the slope and work uphill. Excavated material shall be spread evenly along the uphill slope and compacted using hand tamping or other method approved by the Engineer. On gradually sloped or clay-type soils trenches shall be 2 to 3 inches deep. On loose soils, in high rainfall areas, or on steep slopes, trenches shall be 3 to 5 inches deep, or half the thickness of the wattle.

8-01.3(11) Live Fascines

Live fascines are constructed of live and dead cuttings bundled together with a minimum diameter of 8 inches. Live cuttings shall be willow species native to the project area. Dead branches may be cuttings from any woody, non-invasive plant, native to the project area. Dead branches may be placed on the inside of the live fascine and on the side exposed to the surface. Live branches shall be placed in contact with the soil along their entire length. Each live fascine must contain a minimum of 8 live branches. Dead branches shall constitute no more than 40% of the total fascine content.

The total length of each live fascine shall be a minimum of 5 feet. Branches shall be bound with biodegradable twine spaced at 1-foot intervals along the entire length of the live fascine. Twine shall meet the requirements of Section 9-33.1 Table 3. Live fascines shall be installed in a trench whose depth shall be one-half the diameter of the live fascine. Secure the live fascine with live stakes 3 feet in length and ¾ inch in diameter placed at 18 inch intervals. A minimum of 3 live stakes shall be used per fascine. Live stakes shall be driven through the live fascine vertically into the slope. The ends of live fascines shall be woven together so that no gap remains between the two sections of the live fascine.

8 01.3(12) Compost Sock

The Contractor shall exercise care when installing compost sock to ensure that the method of installation minimizes disturbance of waterways and prevents sediment or pollutant discharge into streambed.

The Contractor shall excavate a shallow trench for the compost. The bottom of the trench shall be one-third the depth of the compost sock. Compost socks shall be laced together end-to-end with coir rope to create a continuous length. Loose ends of the continuous length shall be buried three to five feet laterally into the bank. The upper surface of the compost sock shall be parallel to the slope. Hand tools shall be used to complete finished elevations. Finished grades shall be of a natural appearance with smooth transitions.

The compost sock shall be secured in the trench with wood stakes and live stakes of species as indicated in the Plans.

Wood stakes for compost socks shall be installed and driven into place centered on the top of the compost sock and spaced 3 feet on center throughout the length of the compost sock.

After securing the compost sock the Contractor shall back fill the trench with native soil and tamp it firmly into place.

Compost socks shall meet the requirements of Section 9-14.5(6).

8-01.3(13) Temporary Curb

Temporary curbs may consist of asphalt, concrete, sand bags, compost socks, wattles, or geotextile/plastic encased berms of soil, , sand or gravel, or as approved by the Engineer.

Temporary curbs shall be installed along pavement edges to prevent runoff from flowing onto erodible slopes. The redirected water shall flow to a BMP designed to
convey concentrated runoff. The temporary curbs shall be 4 inches in height.

8- 01.3(14) Temporary Pipe Slope Drain

Pipe slope drain shall be constructed in accordance with the Plans and shall meet the requirements of Section 9-05.1(6).

Water Interceptor dikes or temporary curbs shall be used to direct water into pipe slope drain. Entrance to drain may consist of prefabricated funnel device specifically designed for application, rock, sand bags, or as approved. The soil around and under the pipe section(s) shall be thoroughly compacted to prevent undercutting.

Pipe shall be securely fastened together and have gasketed watertight fittings, and secured to the slope with metal "T" posts, wood stakes, sand bags, or as approved.

Discharge the water to a stabilized conveyance, sediment trap, stormwater pond, rock splash pad, vegetated strip, or as approved.

Placement of drain shall not pond water on road surface and create a road hazard to vehicles or pedestrians.

8-01.3(15) Maintenance

Erosion control devices shall be maintained so they properly perform their function until the Engineer determines they are no longer needed.

The devices shall be inspected on the schedule outlined in Section 8-01.3(1)B for damage and sediment deposits. Damage to or undercutting of the device shall be repaired immediately.

Unless otherwise specified, when the depth of accumulated sediment and debris reaches approximately one-third the height of the device the deposits shall be removed. Debris or contaminated sediment shall be disposed of in accordance with Section 2-01.2. Clean sediments may be stabilized on site using approved best management practices when the Engineer approves.

Erosion control devices that have been damaged shall be repaired or replaced immediately by the Contractor, in accordance with Section 1-07.13(4).

8-01.3(16) Removal

When the Engineer determines that an erosion control device is no longer required, the Contractor shall remove the device and all associated hardware from the project limits. When the materials are biodegradable the Engineer may approve leaving the temporary device in place.

The Contractor shall stabilize all bare and disturbed soil after removal of erosion control devices using best management practices. If the installation and use of the erosion control devices have compacted or otherwise rendered the soil inhospitable to plant growth, such as construction entrances, the Contractor shall take measures to rehabilitate the soil to facilitate plant growth. This may include, but is not limited to, ripping the soil, incorporating soil amendments, or other horticultural practices.

8-01.4 Measurement

ESC lead will be measured by the day, for each day that an inspection is made and a report is filed.

Measurement of erosion control blanket and of plastic covering will be by the square yard measurement of surface area covered and accepted.

Check dams will be measured by the linear foot along the ground line of the completed check dam.

Stabilized construction entrance will be measured by the square yard for each entrance constructed.

Tire wash facilities will be measured per each for each wash installed.

Street cleaning will be measured by the hour for the actual time spent cleaning pavement, as authorized by the Engineer. Time to move the equipment to or from the area on which street cleaning is required will not be measured.

Inlet protection will be measured per each for each initial installation at a drainage structure.

Silt fence, gravel filter, compost, and wood chip berms, and brush barrier will be measured by the linear foot along the ground line of completed barrier.

Straw bale barrier will be measured per each for each bale placed in the initial installation at a barrier location.

Wattle and compost sock will be measured by the linear foot along the ground line of the completed wattle.

Live fascine will be measured by the linear foot.

Temporary curb will be measured by the linear foot.

Temporary Pipe slope drain will be measured by the linear foot of pipe laid as shown in the contract plans.

PAM will be measured by the acre.

8-01.5 Payment

Payment will be made in accordance with Section 1-04.1, for each of the following bid items that are included in the proposal:

"ESC Lead", per day.

"___ Erosion Control Blanket", per square yard.

"Plastic Covering", per square yard.

"Check Dam", per linear foot.

"Stabilized Construction Entrance", per square yard.

"Tire Wash", per each.

The unit contract per each for tire wash shall include all costs associated with constructing, operating, maintaining, and removing the tire wash.

"Street Cleaning", per hour.

"Inlet Protection", per each.

"Silt Fence", per linear foot.

"Gravel Filter Berm", per linear foot.

"Wood Chip Berm", per linear foot.

"Compost Berm", per linear foot.

"Brush Barrier", per linear foot.

"Straw Bale" , per each.

"Wattle", per linear foot.

"Live Fascine", per linear foot.

"Compost Sock", per linear foot.

"Erosion/Water Pollution Control", by force account as provided in Section 1-09.6.

Maintenance and removal of erosion and water pollution control devices including removal and disposal of sediment, stabilization and rehabilitation of soil disturbed by these activities, and any additional work deemed

necessary by the Engineer to control erosion and water pollution will be paid by force account under the item "Erosion/Water Pollution Control".

To provide a common proposal for all bidders, the Contracting Agency has entered an amount in the proposal to become a part of the Contractor's total bid.

"Temporary Curb", per linear foot.

The unit contract price per linear foot for temporary curb shall include all costs to install, maintain, remove, and dispose the temporary curb.

"Temporary Pipe Slope Drain", per linear foot.

The unit contract per linear foot shall be full pay for all work to complete and remove the installation of the pipe slope drain as shown in the plans. All materials shall become the property of the Contractor after removal.

"PAM", per acre

When the contract requires applying PAM as an amendment to seeding, fertilizing, and mulching, or watering operations, all costs for furnishing and applying PAM shall be included in the unit contract price for the associated item of work.